



US005868114A

United States Patent [19]**Kamimura et al.**[11] **Patent Number:** **5,868,114**[45] **Date of Patent:** **Feb. 9, 1999**[54] **AIR FLOW RATE CONTROL APPARATUS**[75] **Inventors:** Yasuhiro Kamimura, Hitachinaka;
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Engineering Co., Ltd., both of Japan[21] **Appl. No.:** 969,708[22] **Filed:** Nov. 24, 19975,452,697 9/1995 Sasaki et al. 123/399
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WO 91/02890 3/1991 WIPO**Related U.S. Application Data**

[63] Continuation of Ser. No. 583,794, Jan. 16, 1996, abandoned.

[30] **Foreign Application Priority Data**Jan. 17, 1995 [JP] Japan 7-004673
Jan. 19, 1995 [JP] Japan 7-006189[51] **Int. Cl.** F02D 11/10; F16K 31/04[52] **U.S. Cl.** 123/399; 251/129.11; 73/117.3;
73/118.2[58] **Field of Search** 123/396, 361,
123/399, 403; 251/129.11; 73/116, 117.3,
118.1, 118.2[56] **References Cited****U.S. PATENT DOCUMENTS**4,840,349 6/1989 Peter et al. 251/129.11
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Lenahan, P.L.L.C.[57] **ABSTRACT**

A throttle control apparatus for an engine on a vehicle is provided, in which the number of component parts in the position detection means and the driven means is reduced to improve the accuracy in its position control and at the same time an integrated wiring is achieved and connectors are aggregated. The position detection means for detecting the position of a control valve, the driven means for controlling the position of the control valve, the means for processing control signals, an output from the position control means for controlling the position of the control valve are disposed within a sealed space defined by a body supporting a control valve shaft, and a cover. Based on the fact that the number of component parts of the position detection means may be reduced, the mechanical hysteresis and electrical hysteresis may also be reduced to improve the accuracy in controlling the control valve position, and it is possible to aggregate the connectors.

20 Claims, 6 Drawing Sheets